Don Guzzetta
Designated Representative, Devon Power
Middleton Power, LLC
1866 River Road
Middletown, CT 06457

Re: Petition to use alternative testing procedures from those found in Section 2.1.2.1 of Appendix E of 40 CFR part 75, for eight units located at Devon Power LLC, Units 15-18, (ORISPL 544) and Middletown Power, Units 12-15 (ORISPL 562)

Dear Mr. Guzzetta:

The United States Environmental Protection Agency (EPA) has reviewed the May 11, 2016[1] petition submitted by Devon Power LLC (Devon) and Middletown Power LLC (Middletown) under §75.66 (l), in which Devon and Middletown request an alternative method of selecting traverse points for Appendix E, NO_X emission rate (lb/mmBtu) –to-heat input (mmBtu) correlation testing procedures for four units at Devon (units 15, 16, 17, and 18) and four units at Middletown (units 12, 13, 14, and 15).

Background

The Devon station in Milford, Connecticut and Middletown station in Middletown, Connecticut own and operate own and operate eight identical General Electric LM6000PC combustion turbines, units 15, 16, 17, 18 at the Devon facility and units 12, 13, 14, 15 at the Middletown facility. As per Devon and Middletown, all eight units can combust either natural gas or ultra-low sulfur distillate oil (Red Dyed Kerosene < 15 ppmvd) and have a nominal rating of approximately 50 MW each. Each is equipped with water injection and selective catalytic reduction (SCR) for nitrogen oxide (NO_X) control as well as oxidation catalyst for carbon monoxide (CO) control.

According to Devon and Middletown, these eight combustion turbines are peaking units, as defined in 40 CFR 72.2. They are subject to the Acid Rain Program. Therefore, Devon and Middletown are required to continuously monitor and report sulfur dioxide (SO_2), nitrogen oxides (NO_X), and carbon dioxide (CO_2) emissions and heat input for these units in accordance with 40 CFR part 75.

Since these are peaking units, and they are gas or oil fired, in lieu of using a continuous emission monitoring system (CEMS) to determine the hourly NOx emission rate from these units, Devon and Middletown use the optional NOx emissions estimation procedures provided in Appendix E of 40 CFR part 75. To use this methodology, a correlation curve of NO_X emission rate versus heat input rate is derived from the results of emission testing. Then, the hourly unit heat input rates are obtained from measurements of fuel flow rate and gross calorific value (GCV), and hourly NO_X emission rates are determined from the correlation curve.

[1] The May 11, 1016 petition is a revision of an earlier submitted petition dated October 22, 2015

Section 2 of Appendix E provides the procedure for developing a correlation curve of NO_X emission rate versus heat input rate. This section requires a four-load NOx emission rate test to be performed for each type of fuel combusted in the unit, except for emergency fuel, for which the testing is optional[2]. The measurement of NO_X and O_2 concentrations must be performed using EPA Reference Methods 7E and 3A[3]. The emission testing is done at four evenly-spaced load levels, ranging from the minimum to the maximum unit operating load, and three test runs are performed at each load per fuel. For stationary gas turbines a sample of 12 points per run (at a minimum) is taken at each load level. The location of the sample points is determined according to Method 1 in appendix A-1 to part 60. During each Appendix E test run, the unit heat input rate is determined using the fuel GCV and readings from a fuel flowmeter that meets the requirements of Part 75, Appendix D. The NO_X emission rate and heat input rate data are averaged at each load level, and a correlation curve of NO_X emission rate (lb/mmBtu) versus heat input rate (mmBtu/hr) is constructed. The correlation curve is then programmed into the data acquisition and handling system (DAHS) and is used to estimate hourly NO_X emission rates. Under Appendix E, Section 2.2 the correlation testing must be repeated at least once every 20 calendar quarters.[4]

In the May 11, 2016 petition, Devon and Middletown indicate that the eight units addressed in the petition operate "very infrequently and have low emissions". Devon and Middletown emphasize that these units operate on a "limited basis" and it is "impossible to schedule the tests when the units would be "normally" operating and the units will have to be brought on-line to perform the tests". Devon and Middletown argue that it is "costly in terms of the fuel combusted solely to perform the tests".

Devon and Middletown request that EPA consider providing some "flexibility" with regards to the Appendix E testing requirements, in particular, the requirement to test at a minimum of 12 traverse points for each of the four load levels. Devon and Middletown request that EPA consider allowing fewer sampling points (traverse points) when "minor or negligible" stratification can be demonstrated. Devon and Middletown point out that EPA has provided such relief with regards to relative accuracy test audits (RATAs) under Section 6.5.6 of Appendix A of Part 75. Section 6.5.6 of Appendix A allows the option of using stratification testing to reduce the number of traverse points used in the RATA.

The stratification test procedures are described in Section 6.5.6.1 of Appendix A of 40 CFR part 75. From the results of the stratification test, considering the acceptance criteria provided in Section 6.5.6.3 of Appendix A, a tester could establish whether or not the Appendix E test could be performed using a "short reference method measurement line" (three traverse points) in lieu of the long measurement line (12 traverse points) or in some cases use a single reference method measurement point located at least one meter from the stack wall and situated along one of the measurement lines used for the stratification test.

In the May 11, 2016 petition, Devon and Middletown provided the results of a

[2] 40 CFR Part 75, Appendix E §2.1.4 describes the process for claiming this exemption.
[3] These test methods are found in Appendices A-2 and A-4 of 40 CFR Part 60.
[4] At the time this petition response was being developed, as per the petition, the Appendix E NO_X correlation testing had been competed at the Devon Station in September 2015. Therefore, this petition response will apply to future Appendix E NO_X correlation testing at this facility.

stratification test that was conducted in July 2015 at the Devon Generating Station on units 15, 16, 17 and 18. Devon and Middletown propose, based on the results of the July 2015 test, that they perform single point traversing during a NO_X correlation test at the Devon plant. Devon and Middletown offer to conduct a similar stratification test on the Middletown units to establish how many traverse points would be appropriate when performing the NO_X correlation test at that facility.

Devon and Middletown point out that the stratification test results will document whether or not stratification is present and the acceptance criteria that is established in Section 6.5.6.3 of Appendix A will be used to determine the degree of traversing necessary to ensure that the emissions are appropriately represented.

EPA's Determination

EPA approves the petition, in part. EPA agrees that the results of a stratification test performed at each load level and for each fuel (as described in Appendix A, section 6.5.6.1) could verify that the concentration profile of the flue gases is not stratified, based on the acceptance criteria found in section 6.5.6.3 of Appendix A, thereby reducing the number of traverse points necessary to perform the Appendix E correlation test. However, EPA believes it is necessary to perform the stratification testing just prior to or concurrent with each Appendix E correlation test rather than relying on a stratification test performed at some earlier date, as was proposed in the May 11, 2016 petition. The results of a stratification test, if performed just prior to or concurrent with each Appendix E correlation test, would confirm that stratification is not present. Based on the results of the stratification test, and the acceptance criteria found in section 6.5.6.3 of Appendix A, the minimum number of traverse points can be determined. If the results of the stratification test meet the criteria specified in section 6.5.6.3, the tester could either: (1) perform three test runs at that load level using fewer than 12 traverse points (i.e., either three points or a single point, depending on the stratification test results); or (2) use the stratification test data as the first test run at that load level, followed by two additional test runs with fewer than 12 points (i.e., either three points or a single point, depending on the stratification test results). Note that both the NO_X concentration and the O_2 concentration measurements must meet the stratification acceptance criteria to justify using fewer than 12 traverse points. If the NO_X and O_2 concentration measurements results differ (e.g., if the NO_X concentration meets the single-point criterion but O_2 concentration meets the 3-point criterion), then you may either use the "worst case" results (i.e., in the example given, perform the subsequent runs at 3 points for both NO_X and O_2) or test at different numbers of points for NO_X and O_2. The minimum sampling time for each test run (including a single point run) shall be 21 minutes plus twice the measurement system response time, and whenever multiple traverse points are used, sampling for an equal amount of time at each point is required. [5] The NO_X and O_2 measurements must be made concurrently in all test runs, in order to obtain valid emission

[5] EPA considers that a twenty minute sampling time as the minimum amount of time necessary to characterize an hour of emissions. The twenty-one minute sampling time required in this petition response was chosen because it is devisable by three (three sampling points) and it is consistent with the sampling strategy for RATA testing described in Part 75, Appendix A, section 6.5.7.

rates for the Appendix E correlation. Stratification testing must be performed prior to or concurrent with each and every individual Appendix E NO_X correlation curve on each unit and must be performed for each fuel being tested to develop a correlation curve. This petition response applies to all eight combustion turbines located at the Devon and Middletown facilities and covers all future Appendix E NOx correlation tests.

EPA's determination relies on the accuracy and completeness of the information provided by Devon and Middletown in the May 11, 2016 petition, and is appealable under Part 78. If you have any questions regarding this determination, please contact Jenny Jachim at 202-343-9590. Thank you for your continued cooperation.

Sincerely,

Reid P. Harvey, Director
Clean Air Markets Division

cc: Susan Lancey, U.S. EPA, Region 1
John DeGirolamo, Connecticut DEEP